

# REMARKS

Claims 6-7 are amended. Support for the amendments to Claims 6-7 is found in Examples 1-2 on pages 23-31 of the Specification, and the data shown in Table 1 on page 34. No new matter has been added.

It is submitted that Claim 6 as amended, and Claim 7 dependent thereon, are neither disclosed nor suggested by the applied reference, Backman, either explicitly or inherently.

The rejection of Claims 6-7 under 35 U.S.C. § 102(e) over the disclosure of Backman et al. (US 2002/0045711, hereafter US '711) is respectfully traversed.

It can be appreciated from the data shown below that the pipes B~K of US '711 do not meet both requirements at notch depth rates of 20% and 40% as claimed in Claim 6.

First, Applicants ask that the Examiner consider a comparison of a measuring method for slow crack growth-breaking time (present invention) and a measuring method for slow crack propagation resistance time US '711.

It is clear from Table 1 below that a measuring method at a notch depth rate of 40% is not disclosed in US '711 (ISO 13479 1997 6.3.2), but both measuring methods are almost the same at a notch depth rate of 20%.

Table 1

		Present Invention		US '711	
Shape of pipe	SDR (standard dimension ratio)	11 <sup>(a)</sup>		No description	
	Nominal outside diameter (dn) [mm $\phi$ ]	63 <sup>(b)</sup>		No description	
	Thickness [mm]	5.8 <sup>(b)</sup>		No description	
Shape of notch	Notch depth [%]	20 <sup>(b)</sup>	40 <sup>(b)</sup>	18~22 <sup>(e)</sup>	
	Ligament thickness [times]	0.8 <sup>(c)</sup>	0.6 <sup>(c)</sup>	0.78~0.82 <sup>(f)</sup>	
Measurement condition	Temperature [°C]	80 <sup>(b)</sup>		80 <sup>(g)</sup>	
	Hoop Stress [MPa]	4.54 <sup>(d)</sup>		4.0 <sup>(g)</sup>	4.6 <sup>(g)</sup>

(a): nominal outside diameter/thickness= 63/5.8 $\approx$ 11. (b): pages 25, line 20-pages 27, line 2 of present specification. (c): 1-Notch depth/100. (d): calculated by equation (14) of present specification (the applied internal pressure P=0.92MPa). (e): calculated from ligament thickness (0.78~0.82). (f): ISO 13479 1997 6.3.2. (g): paragraph [0060] of US '711.

The pipe having a notch depth rate of 20% of Claims 6-7 has a breaking time of 165 hrs or longer hrs and the pipe of US '711 has a slow crack propagation resistance of at least 500 hrs at 4.6 MPa/80°C (see Claim 17 of US '711).

Specifically, the pipes B~K of US '711 have a breaking time (i.e., a slow crack propagation resistance time) of 8~2766 hours as shown in Table 3 (see, Tables 2 to 4 at paragraph numbers: [0128], [0130], and [0132] of US '711). However, US '711 does not disclose a breaking time (a slow crack propagation resistance time) of the pipe having a notch depth rate of 40%.

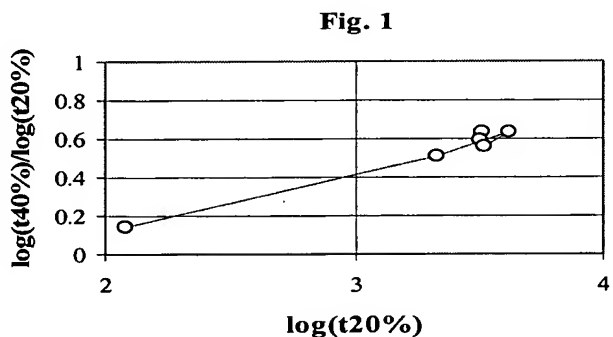
Applicant has found that equation (a) adequately expresses the relationship between  $\log(t_{40\%})/\log(t_{20\%})$  and  $\log(t_{20\%})$  so that values of  $t_{40\%}$  may be calculated based on the data disclosed in US '711.

$$\log(t_{40\%}) / \log(t_{20\%}) = 0.3122 \times \log(t_{20\%}) - 0.5072 \quad (a)$$

Table 2

Present Invention	Example				Comparative Example	
	1	2	3	4	1	2
$t_{20\%}(\text{hr})$	3220	3180	3310	4160	2130	120
$t_{40\%}(\text{hr})$	160	120	90	190	50	2
$\log(t_{20\%})$	3.508	3.502	3.520	3.619	3.328	2.079
$\log(t_{40\%})$	2.20	2.08	1.95	2.28	1.70	0.301
$\log(t_{40\%})/\log(t_{20\%})$	0.63	0.59	0.56	0.63	0.51	0.14

A plot of the data shown in Table 2 reveal a linear correlation with a calculated correlation of  $r^2 = 0.979$  ( $r$ , a coefficient of correlation).



Accordingly, as shown in Table 3, a breaking time of the pipes B~I of US '711 at a notch depth rate of 40% can be calculated. These calculated values are based on the assumption that equation (a) adequately represents the relationship between a breaking time of the pipe having a notch depth rate of 20% and that of the pipe having a notch depth rate of 40% in US '711.

Table 3

US '711	B	C	D	E	F	G	H	I	K
t <sub>20%</sub> (hr)	1217	>1434	1881	1100	1089	2766	97	8	100-200
t <sub>40%</sub> (hr)	25.5	>32.3	48.6	22.1	21.3	89.7	1.7	0.6	1.7-3.7

The data clearly shows that pipes B~K of US '711 have breaking times at a notch depth rate of 40% (0.6 hrs ~ 90 hrs) that are markedly shorter than the presently claimed pipe.

Since the pipes B~K described in US '711 do not meet both requirements at notch depth rates of 20% and 40% as claimed in Claim 6, the pipes disclosed in US '711 do not anticipate amended Claims 6-7.

Furthermore, it is believed that there can be no issue of obviousness as the only pipe described in US '711 that even remotely approaches the characteristic features of the pipes claimed in Claim 6-7, is Pipe G, which has a calculated breaking time of 89.7 hours with a notch depth rate of 40%.

This is in contrast to the pipes of Claims 6 and 7 that have breaking times of 120 and 160 hours or longer, respectively.

It is kindly requested that the Examiner acknowledge that the pipes claimed in Claims 6-7 and both novel and unobvious over the disclosure of US '711.

The rejection of Claims 6-7 under the judicially created doctrine of obviousness-type double patenting over the Claims 11 and 12 of U.S. Patent No. 6,720,048 is obviated by the Terminal Disclaimer filed concurrently herewith.

It is requested that the Examiner withdraw this rejection.

For the Examiner's information, ISO 13479 is attached hereto and is cited in an **Information Disclosure Statement** filed concurrently herewith.

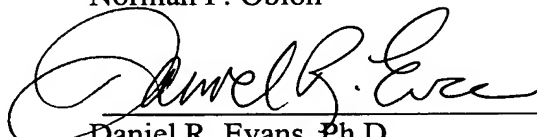
It is submitted that the claims as now presented are in condition for allowance, and early notification to this effect is respectfully requested. Should the Examiner deem that a personal or telephonic interview would be helpful in advancing this application toward allowance, he is encouraged to contact Applicant's undersigned representative at the below-listed telephone number.

Respectfully submitted,

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